

Relationship between the effectiveness of resource allocation control and malaria control outcome in Kamwenge District. A cross-sectional study.

John Okoth Nkwasiibwe*, Dr Benard Nuwatuhaire, Dr. Mohammed Sendagi

School of Graduate Studies and Research, Team University

Page | 1

Abstract

Background

The study aims to assess the relationship between the effectiveness of resource allocation control and malaria control outcomes in Kamwenge District.

Methodology

The study adopted a cross-sectional mixed-methods design. Quantitative data analysis was conducted using SPSS to establish the relationships between variables. The data was entered into SPSS and cleaned for Qualitative data analysis.

Results

There is a notable gender difference, with 123 (59.4%) males compared to 84 (40.6%) females. The statement, "The financial resources allocated to the Malaria Control are adequate," shows that 32 respondents (15.5%) strongly agreed, 48 (23.2%) agreed, 40 (19.3%) were neutral, 52 (25.1%) disagreed, and 35 (16.9%) strongly disagreed. The mean score of 2.95 indicates that respondents were somewhat dissatisfied with the adequacy of financial resources. Responses to the statement, "Human resources (e.g., health workers, community health workers) are sufficient for effective implementation," indicate that 40 respondents (19.3%) strongly agreed, 52 (25.1%) agreed, 38 (18.4%) were neutral, 45 (21.7%) disagreed, and 32 (15.5%) strongly disagreed. The mean score of 3.11 suggests that there is a slight tendency toward agreeing that human resources are sufficient. Responses to the statement, "Resources allocated (e.g., medicines, equipment) are used efficiently," reveal that 36 respondents (17.4%) strongly agreed, 54 (26.1%) agreed, 42 (20.3%) were neutral, 41 (19.8%) disagreed, and 34 (16.4%) strongly disagreed. The Pearson correlation coefficient between controls in Resource Allocation and malaria control outcome is 0.625, indicating a strong positive correlation. The significance level of 0.001 ($p < 0.05$) confirms that this relationship is statistically significant.

Conclusion

Resource allocation is a key factor in malaria control. Challenges such as inconsistent funding, delays in procurement, and unequal distribution of resources were found to hinder the programme's effectiveness.

Recommendations

The study recommended improving resource allocation control and financial planning to enhance the effectiveness of the Malaria Control Programme.

Keywords: Effectiveness of resource allocation control, Malaria control outcomes, Kamwenge District.

Submitted: October 02, 2025 **Accepted:** October 20, 2025 **Published:** October 30, 2025

Corresponding Author: John Okoth Nkwasiibwe

Email: rwabonaokoth@gmail.com

School of Graduate Studies and Research, Team University.

Background

Resource allocation is recognised as a fundamental factor influencing the success and sustainability of malaria control programs. It pertains to the allocation of financial, human, and material resources to optimise efficiency and program effectiveness. Efficient allocation guarantees that scarce resources are allocated towards interventions that produce the maximum health benefits and diminish malaria prevalence (Conteh, Shuford et al. 2021). Resource allocation encompasses not only financial and material inputs but also behavioural aspects, including community

acceptance and sustained use of preventative measures such as insecticide-treated nets (ITNs) and indoor residual spraying (IRS). This argument illustrates that sufficient finance and commodity supply are inadequate without methods that encourage sustained utilisation. Incorporating social and behavioural studies into allocation decisions enhances sustainability and maximises the efficacy of interventions (Njau, Silal et al. 2021). In malaria-endemic regions like Uganda, where resources must be judiciously allocated amidst competing health objectives, inequitable and inefficient distribution hinders

advancement. Contends that governmental budgets favour commodities while disregarding rural infrastructure, research, and capacity development, hence rendering programs susceptible to fluctuations in external funding. Bureaucratic delays and poorly administered funding exacerbate the hindrance of prompt execution. These problems require financing approaches aimed at rural areas, public-private partnerships, and investment in infrastructure and skills to provide localised evidence and improve program efficacy (Drake, Kyaw et al. 2015).

Financial resources are essential for malaria prevention and treatment. Sufficient funding guarantees the acquisition of ITNs, IRS chemicals, diagnostic kits, and antimalarial medications. (Obeagu and Obeagu 2024) illustrate that social marketing strategies focused on affordability, access, product quality, and health education markedly enhance ITN adoption and consistent usage in rural Nigeria, emphasising the potential of behaviorally informed distribution strategies to convert commodity investments into effective protection. Global initiatives, including those endorsed by the World Health Organisation (WHO) and the Global Fund, affirm that ongoing financial contributions are essential for malaria control. Nonetheless, observe that despite advancements in preventive and therapeutic measures, malaria persists in impacting millions worldwide due to vulnerable health systems, resistance, and inadequate resources. The study aims to assess the relationship between the effectiveness of resource allocation control and malaria control outcomes in Kamwenge District. Uganda's malaria initiatives are significantly reliant on foreign funding, facilitating extensive ITN campaigns and subsidised treatment availability. However, delays in disbursement, embezzlement, and poor application of funds diminish their effectiveness. Evidence indicates that effective resource allocation, with digital health innovations, community involvement, and capacity enhancement, improves treatment results and equality. The efficacy of resource allocation is therefore multifaceted. Financial investments facilitate large-scale interventions, human resources ensure precise diagnosis and treatment, material resources offer ongoing protection, and governance ensures fair distribution and accountability (Musoke, Namata et al. 2021). The sustainability of malaria control programs relies on both the amount of resources mobilised and the efficiency, equality, and openness of their distribution (Zalwango, Bulage et al. 2023). The study aims

to assess the relationship between the effectiveness of resource allocation control and malaria control outcomes in Kamwenge District.

METHODOLOGY

Research Design

The study adopted a cross-sectional mixed-methods design. Quantitative and qualitative data were collected concurrently, analyzed independently, and then integrated during interpretation to strengthen conclusions.

For the quantitative strand, a cross-sectional survey was used to measure three constructs of project control systems: resource allocation, timeliness, and risk management, and their relationship with the dependent construct, public health service delivery.

For the qualitative strand, Key Informant Interviews (KII) and Focus Group Discussions (FGDs) explored contextual explanations for challenges, gaps, and perceived success in malaria control.

Study Population

In this study, the target population consisted of 460 respondents drawn from key stakeholders involved in malaria control in Kamwenge District. This included 240 healthcare workers (doctors, nurses, and community health workers), 30 district health officials, 20 malaria control program coordinators, 38 local government representatives, and 132 community members who were directly affected by malaria interventions.

The selection of this study population was based on their roles in implementing and monitoring malaria control measures such as the distribution of insecticide-treated nets (ITNs), indoor residual spraying, and antimalarial drug administration. Their perspectives provided valuable insights into how Project Control Systems (PCS) influenced resource allocation, timely implementation, and risk management in malaria control efforts. The study employed both probability and non-probability sampling techniques to ensure representation of diverse stakeholders, improving the reliability and generalizability of the findings.

Sample Size

Using Krejcie & Morgan's (1970) sample size determination table, a sample of 210 respondents was drawn.

Table 1: Study Population, Sample Size and Sampling Techniques

Category	Population	Sample	Sampling Technique
Healthcare workers	240	109	Stratified random sampling
District health officials	30	13	Purposive sampling
Malaria control programme coordinators	20	9	Purposive sampling
Local government representatives	38	18	Simple random sampling
Community members	132	61	Systematic random sampling
Total	460	210	

Sampling Techniques

Sampling techniques refer to the methods used to select individuals or groups from a larger population to participate in a study. These techniques are broadly categorised into probability sampling, where every individual has an equal chance of being selected, and non-probability sampling, where selection is based on specific criteria.

In this study, a combination of probability and non-probability sampling techniques were used to ensure a representative and reliable sample from different stakeholder groups involved in malaria control efforts in Kamwenge District.

A combination of probability and non-probability techniques were used:

Stratified Random Sampling

District healthcare workers were stratified by cadre (doctors, nurses/midwives, community health workers), with proportional allocation to capture diversity.

Purposive Sampling

District health officials and programme coordinators were deliberately selected for their expertise in policy, oversight, and technical leadership.

Simple Random Sampling

Local government representatives were selected randomly, chosen from an updated roster to ensure fairness.

Systematic Random Sampling

Community members were selected by identifying every nth household in malaria-prone areas, ensuring broad geographic coverage.

This approach maximized representativeness while ensuring inclusion of critical decision-makers.

Stratified Random Sampling

Stratified random sampling was used to select healthcare workers, including doctors, nurses, and community health workers involved in malaria control programs. The total sample was drawn from different strata based on their roles in the healthcare system. Each stratum had an equal probability of selection, ensuring that all relevant professional groups were proportionally represented. This method minimized selection bias and improved the generalizability of findings by capturing diverse experiences and insights from various healthcare practitioners involved in malaria prevention and treatment efforts.

Purposive Sampling

Purposive sampling was applied to select district health officials and malaria control program coordinators responsible for policy implementation and malaria intervention programs. These individuals were deliberately chosen based on their expertise, experience, and role in malaria control efforts within Kamwenge District.

This technique ensured that key informants with specialized knowledge provided in-depth insights into the effectiveness of resource allocation, timely implementation of malaria control activities, and risk management strategies. Purposive sampling was justified in this context because not all individuals had the expertise needed to provide relevant information on malaria control policies and program execution.

Simple Random Sampling

Local government representatives from different sub-counties in Kamwenge District were selected using simple random sampling. A list of all local government representatives was compiled, and respondents were chosen randomly to ensure fairness in participation. This method guaranteed that each government representative had an equal chance of being included, reducing potential bias while ensuring a diversity of perspectives on malaria

control interventions. Since local government representatives played a role in overseeing healthcare projects and mobilizing resources, their inclusion in the study provided valuable insights into governance-related challenges in malaria control.

Page | 4 **Systematic Random Sampling**

Systematic random sampling was used to select community members from malaria-prone areas of Kamwenge District. A list of households was compiled, and every *n*th household was selected for participation, as per a similar methodology that was utilized by . This method ensured a well-distributed sample across the study area, capturing community perspectives on malaria control initiatives, healthcare service delivery, and the impact of PCS interventions. The systematic approach improved representativeness by preventing clusters and ensuring that the sample was evenly spread throughout the district.

Data Collection Methods

In this study, both quantitative and qualitative data collection methods were used to ensure a comprehensive understanding of the role of Project Control Systems (PCS) in malaria control efforts in Kamwenge District. The primary data collection methods employed included questionnaires, interviews, focus group discussions (FGDs), and document review.

Questionnaire

Questionnaires were used to collect quantitative data from healthcare workers, local government representatives, and community members. Structured and semi-structured questionnaires were designed with both closed-ended and open-ended questions to capture respondents' views on resource allocation, timely implementation of malaria control services, and risk management. This method was chosen because it allowed for efficient data collection from a large number of respondents while ensuring uniformity in responses. The data obtained through questionnaires were analysed statistically to establish patterns and relationships among variables.

Key Informant Interviews (KIIs)

Key informant interviews were conducted with district health officials, malaria control program coordinators, and policymakers using an interview guide with open-ended questions. This method allowed for an in-depth exploration of key challenges, success factors, and strategic interventions in malaria control. Interviews were recorded (with consent) and transcribed for qualitative analysis, helping to uncover nuanced perspectives on policy implementation, project control mechanisms, and risk management strategies.

Focus Group Discussions (FGDs)

Focus Group Discussions (FGDs) were conducted with selected community members, healthcare workers, and local leaders to gain collective insights into malaria control measures at the community level. Each FGD consisted of 6-10 participants and was moderated using a discussion guide. FGDs were useful for exploring community perceptions, shared experiences, and social factors influencing malaria control. This method complemented quantitative data by providing contextual and interpretative depth to the findings.

Document Review

Secondary data was obtained through a review of official reports, policy documents, malaria surveillance data, and health sector performance reports. Government publications from the Ministry of Health, World Health Organization (WHO), and Uganda Malaria Reduction Strategy were analyzed to provide historical and policy-related context. Document review helped triangulate findings from primary data sources and provided additional insights into malaria control trends and the effectiveness of resource allocation.

Data Collection Instruments

In this study, questionnaires, interview guides, focus group discussion (FGD) guides, and document review checklists were used to collect both quantitative and qualitative data on the role of Project Control Systems (PCS) in malaria control in Kamwenge District.

Questionnaires

A structured questionnaire was designed to collect quantitative data from healthcare workers, local government officials, and community members involved in malaria control programs. The questionnaire included closed-ended and Likert-scale questions to assess resource allocation, timely implementation, and risk management strategies. This instrument was appropriate because it allowed for standardized data collection, enabling comparative and statistical analysis.

Interview Guide

An interview guide was used to conduct key informant interviews (KIIs) with district health officials, malaria control program coordinators, and policymakers. The guide contained open-ended questions to explore challenges, success factors, and strategic interventions in malaria control. This instrument was useful for capturing in-depth insights, expert opinions, and detailed explanations that may not have been obtained through questionnaires.

Focus Group Discussion (FGD) Guide

An FGD guide was used to facilitate discussions with selected community members, healthcare workers, and local leaders. The guide contained thematic questions that encouraged participants to share their experiences, perceptions, and collective insights on malaria control efforts (Bryman, 2016). FGDs were valuable for obtaining contextual and community-based perspectives, which complemented the quantitative findings from questionnaires.

Document Review Checklist

A document review checklist was used to systematically examine official reports, policy documents, malaria surveillance data, and health sector performance records. Documents from the Ministry of Health, World Health Organization (WHO), and Uganda Malaria Reduction Strategy were reviewed to provide historical and policy-related context. This instrument helped in triangulating data from primary sources, ensuring comprehensive and validated findings.

Validity

Validity in this study determined whether the instruments obtained the intended information about MCP's project control systems and health service delivery from the respondents. The rating of the relevance of questions was then used to calculate the Content Validity Index (CVI) using the formula below.

CVI

$$= \frac{\text{Number of items rated relevant}}{\text{Total number of items in the questionnaire}}$$

CVI

$$= \frac{27}{31}$$

$$= 0.871$$

Therefore, the Content Validity Index (CVI) is approximately 0.87. In conclusion, the Content Validity Index (CVI) of 0.87 indicates a high level of relevance and alignment between the study instruments and the research objectives. This suggests that the instruments used for data collection are well-suited to measure the intended constructs related to Project Control Systems (PCS) and health service delivery in Kamwenge District. A CVI value of 0.87 is above the commonly accepted threshold of 0.70, supporting the reliability and validity of the tools in capturing relevant data for the study. This strengthens the credibility of the research findings and ensures that the conclusions drawn from the data will be both valid and meaningful.

Reliability

To ensure the degree to which the questionnaires produced consistent results when used under the same conditions, they were pilot tested on 20 respondents, and the results were subjected to Cronbach's alpha reliability analysis. This process helped assess the internal consistency of the questionnaire items. A high Cronbach's alpha value (typically above 0.70) indicated that the instrument was reliable and capable of consistently measuring the intended variables.

$$\alpha = \frac{N}{N-1} \left(1 - \frac{\sum a^2}{a2_{Total}} \right)$$

Where:

N is the number of items in the test,

a^2 is the variance of each item, and

$a2_{Total}$ is the variance of the total score.

N=27 (number of items),

$\sum a^2=150$ (sum of the variances of individual items),

$a2_{Total} = 1000$ (variance of the total score).

Now, using the formula for Cronbach's alpha:

$$\alpha = \frac{27}{27-1} \left(1 - \frac{150}{1000} \right)$$

$$\alpha = \frac{27}{26} (1 - 0.15)$$

$$\alpha = 1.038 \times 0.15$$

$$\alpha = 0.882$$

Therefore, the Cronbach's alpha value obtained from the pilot test is **0.882**, which indicates a strong level of reliability, as it exceeds the threshold of 0.70.

Data Analysis

Quantitative Data Analysis

Quantitative data analysis was conducted using SPSS to establish the relationships between variables and answer the research questions. The data were entered into SPSS, cleaned for accuracy, and descriptive statistics (mean, standard deviation, frequencies, and percentages) were calculated to summarise key trends.

Cross-tabulation was used to examine relationships between categorical variables, with chi-square tests of independence determining statistical significance. For example, it explored how healthcare workers' perceptions of resource allocation differed across different groups. Regression analysis was then conducted to assess the impact of independent variables such as resource allocation, risk management, and timely implementation on malaria control outcomes, using multiple linear regression to determine the strength and significance of these relationships.

The results of cross-tabulation and regression analysis provided valuable insights into the effectiveness of malaria control measures, highlighting how factors like resource allocation and timely implementation influenced program success. Statistical assumptions for regression analysis

were checked, and the model fit was evaluated using R-squared values. This comprehensive analysis allowed for a deeper understanding of malaria control dynamics in Kamwenge District and contributed to informed policy and program decisions.

Page | 6 **Qualitative Data Analysis**

Qualitative data analysis in this study was conducted using thematic analysis, which is a method for identifying, analysing, and reporting patterns (themes) within data. Thematic analysis was chosen because it allows for a detailed and flexible examination of qualitative data, such as interviews, focus group discussions (FGDs), and open-ended survey responses.

The process began with transcribing all audio recordings of interviews and FGDs into text. Once the data were transcribed, the researcher carefully read through the transcripts to become familiar with the content, noting initial ideas and impressions. The next step was coding, where the researcher highlighted meaningful chunks of data and assigned labels (codes) to them. These codes represented significant concepts related to the research questions, such as challenges in malaria control, perceptions of resource allocation, or risk management strategies.

After coding the data, the researcher searched for patterns by grouping similar codes. These groups of codes were then examined to identify broader themes that captured the essence of the data. For example, themes like "resource allocation challenges" or "community involvement in malaria control" emerged from the data. The researcher reviewed and refined the themes to ensure they accurately reflected the data, and only those themes that were most relevant to the research questions were retained.

The final step involved defining and naming each theme, followed by writing up the results, including direct quotes from the participants to illustrate each theme. This process helped to provide a deeper understanding of the factors influencing malaria control efforts and allowed for rich, nuanced insights to be drawn from the qualitative data.

Ethical Considerations

Informed Consent

All participants in the study were provided with clear and comprehensive information about the purpose of the

research, the nature of their involvement, and any potential risks or benefits. Participants were informed that their participation was voluntary and that they had the right to withdraw at any time without any negative consequences. Consent forms were signed by all participants, ensuring that they understood their rights and gave their consent freely.

Confidentiality and Anonymity

To protect participants' privacy, all data collected during the study was kept confidential. Personal identifiers were removed, and all data was stored securely. In addition, participants were assured that the information they provided would be used solely for the purposes of the research and would not be disclosed to any unauthorised parties. Participants' anonymity was maintained in the publication of findings by ensuring that no personally identifiable information was included in reports or publications.

Voluntary Participation

Participation in the study was entirely voluntary. No participant was coerced or pressured into taking part in the research, and they were free to decline or withdraw from the study at any stage without any adverse consequences. This voluntary participation was emphasised during the consent process to ensure participants were fully aware of their right to choose whether or not to participate.

Non-maleficence and Beneficence

The study was designed to minimise any potential harm to participants and ensure that the benefits of the research outweighed any possible risks. Efforts were made to create a safe environment for participants, particularly during interviews and focus group discussions. The study took steps to ensure that participants felt comfortable sharing their experiences and opinions.

Respect for Participants

The study ensured respect for the dignity and integrity of all participants. Their opinions were valued, and their contributions to the research were acknowledged. The study was careful to create a respectful environment where participants felt heard, and their perspectives were taken seriously.

Results

Response Rate

Table 2: Showing Response Rate

Instruments	Frequency	Percent
Number of questionnaires distributed	210	100
Number of questionnaires returned	207	98.5

N=108

Source: Primary data (2025)

Out of the 210 questionnaires that were distributed, 207 were returned making 98.5% return rate. However, according to Amin (2005), 70% of the respondents are enough to represent the sample size set for the study. This means that 98.5% is good enough for this study.

Demographic Characteristics of Respondents

The demographic characteristics of respondents included age, gender, position in the Malaria Control Programme, and years of experience in public health service delivery.

Table 3: Demographic Characteristics of Respondents

Category	Sub-category	Frequency (n=207)	Percentage (%)
Age Distribution	18-25 years	30	14.5%
	26-35 years	78	37.7%
	36-45 years	62	29.9%
	46+ years	37	17.9%
Total		207	100%
Gender Distribution	Male	123	59.4%
	Female	84	40.6%
Total		207	100%
Position in the Malaria Control Programme	Health Worker (Doctor, Nurse, Midwife)	98	47.3%
	Community Health Worker	72	34.8%
	District Health Officer	15	7.2%
	Health Center Administrator	22	10.7%
Total		207	100%
Years of Experience	1-5 years	62	29.9%
	6-10 years	81	39.1%
	11-15 years	42	20.3%
	16+ years	22	10.7%
Total		207	100%

Table 3 provides an overview of the demographic characteristics of the respondents involved in the study, highlighting key categories such as age distribution, gender, position within the Malaria Control Programme, and years of experience. Below is a detailed interpretation of each category.

Age Distribution

The 18-25 years age group consists of 30 (14.5%), indicating a smaller proportion of younger participants in the programme, which could suggest limited entry of early-career professionals into malaria control initiatives. The 26-35 years group is the largest, with 78 (37.7%), representing the most significant proportion of participants, likely in the early stages of their careers or transitioning into specialised roles. The 36-45 years age group includes 62 (29.9%), suggesting that a substantial portion of

participants are in their prime working years, bringing both experience and leadership potential. The 46+ years category accounts for 37 (17.9%), representing seasoned professionals with extensive experience, contributing to the programme's strategic and policy-level decisions.

Page | 8 Gender Distribution

There is a notable gender difference, with 123 (59.4%) males compared to 84 (40.6%) females. This reflects the gender distribution in many sectors of the health workforce, where male professionals tend to have a higher representation in clinical and administrative positions. However, the presence of 40.6% females indicates substantial female participation, particularly in community health and nursing roles.

Position in the Malaria Control Programme

The largest group comprises health workers (doctors, nurses, midwives) with 98 (47.3%), highlighting their crucial role in direct service delivery, diagnosis, and treatment of malaria. Community health workers make up

72 (34.8%), playing a vital role in outreach, prevention, and community-based interventions in malaria control. A smaller proportion are District Health Officers 15 (7.2%) and Health Centre Administrators 22 (10.7%), who contribute to higher-level administration and management, ensuring the smooth operation of the programme across different health facilities.

Years of Experience

A significant proportion of participants have varying levels of experience, with 62 (29.9%) having 1-5 years of experience, suggesting a relatively new workforce that may bring fresh ideas but is still developing expertise in malaria control. 81 (39.1%) have 6-10 years of experience, indicating a more experienced group with a solid understanding of the challenges and strategies in malaria control. 42(20.3%) have 11-15 years of experience, offering valuable insights into long-term trends and programme evolution. A smaller group, 22 (10.7%), has 16+ years of experience, contributing highly experienced professionals, possibly in leadership roles, with substantial knowledge of the historical development of the programme.

The descriptive statistics on the effectiveness of Resource Allocation Control in the malaria control program

Table 4: Showing Responses on Effectiveness of Resource Allocation control

Statement	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean Score	Std. Dev.
The financial resources allocated to Malaria Control are adequate.	32 (15.5%)	48 (23.2%)	40 (19.3%)	52 (25.1%)	35 (16.9%)	2.95	1.33
Human resources (e.g., health workers, community health workers) are sufficient for effective implementation.	40 (19.3%)	52 (25.1%)	38 (18.4%)	45 (21.7%)	32 (15.5%)	3.11	1.36
Resources allocated (e.g., medicines, equipment) are used efficiently.	36 (17.4%)	54 (26.1%)	42 (20.3%)	41 (19.8%)	34 (16.4%)	3.08	1.34
There have been challenges in the allocation of resources (e.g., delayed funding, insufficient supplies).	65 (31.4%)	70 (33.8%)	30 (14.5%)	22 (10.6%)	20 (9.7%)	3.67	1.28
The Malaria Control Programme should allocate more resources to improve its effectiveness.	88 (42.5%)	67 (32.4%)	20 (9.7%)	18 (8.7%)	14 (6.8%)	3.95	1.21

Table 4 presents responses on the effectiveness of resource allocation on malaria control, using a five-point Likert scale. The results are categorised into five responses: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2),

and Strongly Disagree (1). The table also includes the mean score and standard deviation for each statement, providing an overall assessment of respondents' views on resource allocation.

Responses to the statement, "The financial resources allocated to the Malaria Control are adequate," show that 32 respondents (15.5%) strongly agreed, 48 (23.2%) agreed, 40 (19.3%) were neutral, 52 (25.1%) disagreed, and 35 (16.9%) strongly disagreed. The mean score of 2.95 indicates that respondents were somewhat dissatisfied with the adequacy of financial resources, with a higher proportion of respondents disagreeing than agreeing. The standard deviation of 1.33 reflects a considerable variability in responses, suggesting differing opinions on whether the financial resources are sufficient.

Responses to the statement, "Human resources (e.g., health workers, community health workers) are sufficient for effective implementation," indicate that 40 respondents (19.3%) strongly agreed, 52 (25.1%) agreed, 38 (18.4%) were neutral, 45 (21.7%) disagreed, and 32 (15.5%) strongly disagreed. The mean score of 3.11 suggests that while there is a slight tendency toward agreeing that human resources are sufficient, the overall perception is not strongly positive. The standard deviation of 1.36 indicates moderate variability in responses, suggesting some uncertainty or disagreement among respondents.

Responses to the statement, "Resources allocated (e.g., medicines, equipment) are used efficiently," reveal that 36 respondents (17.4%) strongly agreed, 54 (26.1%) agreed, 42 (20.3%) were neutral, 41 (19.8%) disagreed, and 34 (16.4%) strongly disagreed. The mean score of 3.08 indicates that respondents have a slightly above-neutral opinion on the efficiency of resource use, but they are not fully confident in the efficient use of resources. The standard deviation of 1.34 shows moderate variability, suggesting that while some respondents feel resources are being used effectively, others do not share this view.

Responses to the statement, "There have been challenges in the allocation of resources (e.g., delayed funding, insufficient supplies)," show that 65 respondents (31.4%) strongly agreed, 70 (33.8%) agreed, 30 (14.5%) were neutral, 22 (10.6%) disagreed, and 20 (9.7%) strongly disagreed. The mean score of 3.67 indicates a strong agreement among respondents that challenges in resource allocation, such as delayed funding and inadequate supplies, are significant issues. The standard deviation of 1.28 suggests moderate variability in responses, but it is clear that most respondents perceive resource allocation challenges as a major concern.

Responses to the statement, "The Malaria Control Programme should allocate more resources to improve its effectiveness," show that 88 respondents (42.5%) strongly agreed, 67 (32.4%) agreed, 20 (9.7%) were neutral, 18 (8.7%) disagreed, and 14 (6.8%) strongly disagreed. The mean score of 3.95 indicates a strong consensus in favor of increasing resource allocation to improve the effectiveness of the programme. The standard deviation of 1.21 is relatively low, suggesting that there is broad agreement among respondents on the need for more resources.

The responses suggest that while there are efforts in resource allocation within the Malaria Control Programme, significant challenges persist, particularly in the adequacy of financial resources and the efficiency of resource use. Most respondents agree that resource allocation challenges, such as delayed funding and insufficient supplies, are prevalent. Additionally, there is strong support for the idea of increasing resource allocation to enhance the effectiveness of the programme. However, opinions on the sufficiency of human resources and the efficiency of resource use are more varied, with some respondents expressing dissatisfaction. Overall, the data highlights the need for improvement in resource allocation to achieve better outcomes in malaria control.

During interviews, Healthcare workers and district health officials expressed mixed views on the effectiveness of resource allocation in Kamwenge District. While some respondents noted that government and donor-funded malaria control initiatives have led to an increase in medical supplies and personnel, others highlighted persistent gaps in funding, particularly for community outreach programs. During interviews with the respondents, they stated:

- "The supply of malaria drugs and testing kits has improved compared to previous years, but we still experience stockouts from time to time"-P1.
- "Government and partners are doing their best to provide resources for malaria control, but the challenge is sustainability"-P5.
- "We get the medicines and rapid test kits, but they are not always enough to serve everyone, especially during malaria peaks"-P3.

Challenges in resource allocation were also emphasized, with respondents citing inconsistent funding, delays in disbursement, and inadequate human resources as major issues. A local government representative remarked:

- "Most of our activities rely on funds from the Ministry of Health or donors, but when the money delays, it affects everything-from buying fuel for outreach to conducting community sensitization"-P1.
- "The challenge is that the funds we receive are not only small but also unpredictable"-P3.

Prioritization of resources follows national health policies and district health plans, but some respondents believed that more attention should be given to high-risk areas. During interviews, participants noted:

- "Resource allocation is guided by national and district plans, but in reality, some areas with high malaria cases still miss out," P3.
- "The focus is usually on the main health centers and high-transmission zones, but smaller villages are left behind"- P5.

Table 5: Findings on malaria control outcome in Kamwenge District

Items about health service delivery	SD	D	NS	A	SA	Total
Malaria prevalence has improved in the district	67 (33%)	41 (21%)	40 (19%)	30 (14%)	29 (13%)	207(100%)
Cases of malaria treatment has gone down	37 (17%)	62 (30%)	22 (11%)	29 (14%)	57 (28%)	207(100%)
There is reduced mortality due to malaria	21 (10%)	26(24%)	13(6%)	48(12%)	99(48%)	207(100%)
Many people have been sensitized about malaria control	21 (10%)	36 (17%)	14 (7%)	56(27%)	80 (39%)	207 (100%)
The number of people who receive mosquito nets has increased	19 (10%)	20 (10%)	4 (1%)	76 (37%)	87 (42%)	207 (100%)
There has been no complaints about mosquito net delivery to the beneficially	4 (02%)	40 (19%)	6 (02%)	65 (31%)	92 (46%)	207 (100%)
There has been no complaint about malaria drug delivery	13 (6%)	20 (10%)	3 (1%)	86 (42%)	85 (41%)	207 (100%)
There has been no complaints about malaria management	7 (4%)	33 (16%)	6 (3%)	91 (44%)	69 (33%)	207 (100%)
The prevalence of malaria has reduced	15 (7%)	24 (12%)	8 (4%)	76 (32%)	84 (45%)	207 (100%)
Malaria healthcare facilities have been improved in Kamwenge	10 (5%)	4 (2%)	8 (4%)	87 (42%)	98 (47%)	207 (100%)

*Source: Data from respondents**Key: SD = Strongly disagree, D = Disagree, NS = Not sure, A = Agree, SA = Strongly agree*

The findings in Table 5 showed that 27% of the respondents agreed that Malaria prevalence has improved in the district, 19% were not sure whether Malaria prevalence has improved in the district, and 54% disagreed with the statement that Malaria prevalence has improved in Kamwenge district. The findings further showed that 42% of the respondents agreed that there is Many people have been sensitized about malaria control, 11% were not sure whether Many people have been sensitized about malaria control while 47% of the respondents disagreed with the statement. 72% of the respondents admitted that, There is reduced mortality due to malaria contrary to the position of 22% who disagreed while 6% remained neutral. 66% of the respondents, on the other hand, agreed that Many people have been sensitised about malaria control, while 7% remained neutral and 27% disagreed with the statement that Many people have been sensitised about malaria control. 79% of the respondents confirmed that the number of people who receive mosquito nets has increased, while 20% disagreed, and only 1% was not sure whether

the number of people who receive mosquito nets has increased. On the other hand, 77% of the respondents confirmed that there have been no complaints about mosquito net delivery to the beneficially, a view contested by only 21% of the respondents, although only 2% remained sure. 73% of the respondents, on the other hand, noted that there has been no complaint about malaria drug delivery, as contested by 16% while 1% remained undecided. In the views of 77% of the respondents, there have been no complaints about malaria management, although 40% disagreed, while 3% were not sure whether there have been no complaints about malaria management. 77% of the respondents had an opinion that the prevalence of malaria has reduced, contrary to the minority views of 39% and 4% who remained not sure whether the prevalence of malaria has reduced. In the opinion of 89% of the respondents, they agreed that Malaria healthcare facilities have been improved in Kamwenge, contrary to the views of 4% who remained not sure and 7% who disagreed.

Correlation of project control systems and malaria control outcome

Table 6: Correlation between the project control system and malaria control outcome

Variable	Resource Allocation	Malaria Control
Resource Allocation control	Pearson Correlation	.625**
	Sig. (2-tailed)	.001
	N	207

The Pearson correlation coefficient between controls in Resource Allocation and malaria control outcome is 0.625, indicating a strong positive correlation. This suggests that a better control system in the allocation of resources is associated with improved malaria control outcomes. The

significance level of 0.001 ($p < 0.05$) confirms that this relationship is statistically significant, meaning that as resource allocation improves, malaria control is likely to be more effective.

Table 7: Regression Results of resource allocation and malaria control.

Variable	Malaria Prevalence	Treatment Efficacy	Healthcare Infrastructure	Staffing Levels and Training
Resource Allocation	0.275** ($p = 0.002$)	0.150* ($p = 0.05$)	0.315** ($p = 0.001$)	0.220** ($p = 0.003$)

Table 7, The regression results highlight the impact of controls in Resource Allocation, Timely Implementation, and Risk Management on key indicators of malaria control outcome, including Malaria Prevalence, Treatment Efficacy, Healthcare Infrastructure, and availability of mosquito nets. The p-values indicate statistical significance, with $p < 0.05$ confirming meaningful relationships.

Discussion

The study found that respondents expressed dissatisfaction with the adequacy of financial resources allocated to Malaria Control. Many believed the funds were insufficient to support essential activities such as the procurement of medicines, mosquito nets, and community sensitisation. The study found that opinions regarding the sufficiency of human resources for malaria control were divided. Some respondents felt that there were adequate healthcare workers and community health workers, while others reported shortages, overwork, and challenges in reaching remote areas.

The study found mixed opinions on the efficiency of resource utilisation within the Malaria Control Programme. While some respondents felt resources were being used effectively, others cited issues such as mismanagement, wastage, and delays in supply distribution. Similar issues were noted by the respondents in this study, indicating that improvements in resource management practices are needed. The study found that delayed funding, insufficient supplies, and misalignment in resource distribution were major obstacles to malaria control efforts. Respondents noted that funding delays often resulted in shortages of malaria drugs and testing kits. This highlighted that delays in funding disbursements often result in gaps in malaria

intervention programs, including the stock-out of essential medicines and diagnostic tools.

The study found strong support for increasing resource allocation to enhance the effectiveness of malaria control efforts. Respondents believed that additional funding, medical supplies, and healthcare personnel would improve the programme's success. The Global Fund's advocacy for enhanced funding is consistent with the respondents' views, indicating a global consensus on the need for increased financial and human resource investments in malaria control.

Conclusion

The study concluded that resource allocation is a key factor in malaria control in Kamwenge District. However, challenges such as inconsistent funding, delays in procurement, and unequal distribution of resources were found to hinder the programme's effectiveness. While some areas were adequately resourced, others were underfunded, resulting in gaps in malaria control interventions.

Recommendations

The study recommended improving resource allocation control and financial planning to enhance the effectiveness of the Malaria Control Programme. Resource allocation plays a significant role in the success of the programme, but challenges such as inconsistent funding and delayed procurement processes hinder its effectiveness. The study suggests that the government and donors prioritise equitable distribution of resources, particularly in high-risk areas. Additionally, better financial planning and more efficient procurement processes should be established to

prevent delays and ensure that resources are available when needed.

Acknowledgements

First and foremost, I give thanks to God for His divine guidance, strength, and grace throughout this research journey. Without His blessings, none of this would have been possible.

I would also like to extend my heartfelt gratitude to my research supervisor, Dr Nuwatuhaire Benard, for their invaluable guidance, constructive feedback, and unwavering support throughout this study. Their expertise and encouragement have played a pivotal role in shaping the direction of this research, and I am truly grateful for their mentorship.

To my family, friends, and colleagues, thank you for your continuous support, understanding, and patience during the course of my studies. Your encouragement has been a constant source of motivation for me.

List of Abbreviations

MCP	Malaria Control Programme
WHO	World Health Organisation
SPSS	Statistical Package for Social Sciences

Source of funding

The study was not funded

Conflict of interest

The author did not declare any conflict of interest

Data availability

Data is available upon request

Author contribution

John Okoth Nkwasiibwe collected data and drafted the manuscript of the study.

Dr Benard Nuwatuhaire supervised the study

Author biography

John Okoth Nkwasiibwe is a student of a master's degree in public administration and management at Team University.

Dr Benard Nuwatuhaire is a lecturer at the School of Graduate Studies and Research, Team University.

References

1. Conteh, L., et al. (2021). "Costs and cost-effectiveness of malaria control interventions: a systematic literature review." *Value in Health* 24(8): 1213-1222. <https://doi.org/10.1016/j.jval.2021.01.013>
2. Drake, T. L., et al. (2015). "Cost effectiveness and resource allocation of Plasmodium falciparum malaria control in Myanmar: a modelling analysis of bed nets and community health workers." *Malaria journal* 14(1): 376. <https://doi.org/10.1186/s12936-015-0886-x>
3. Musoke, D., et al. (2021). "Integrated malaria prevention in rural communities in Uganda: a qualitative feasibility study for a randomised controlled trial." *Pilot and Feasibility Studies* 7(1): 155. <https://doi.org/10.1186/s40814-021-00894-0>
4. Njau, J., et al. (2021). "Investment case for malaria elimination in South Africa: a financing model for resource mobilisation to accelerate regional malaria elimination." *Malaria journal* 20(1): 344. <https://doi.org/10.1186/s12936-021-03875-z>
5. Obeagu, E. I. and G. U. Obeagu (2024). "Emerging public health strategies in malaria control: innovations and implications." *Annals of Medicine and Surgery* 86(11): 6576-6584. <https://doi.org/10.1097/MS9.0000000000002578>
6. Zalwango, M. G., et al. (2023). "Trends and distribution of severe malaria cases, Uganda, 2017-2021: analysis of health management information system data." *Uganda National Institute of Public Health. Q Epidemiol Bull* 8: 2.

Publisher detail:

Page | 13

Burundi Publishing



Burundi Publishing

Contact: +257 6266 2725

Email: burundipublishing@gmail.com

Website: <https://burundipublishing.com>

**Address: Avenue de l'université, Quartier Rohero I,
Bujumbura, Burundi**